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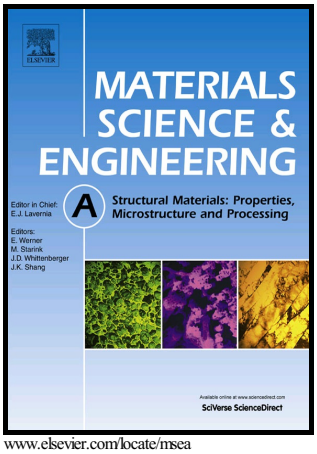


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# Biaxial creep performance of CWSR Zircaloy-4 cladding at emulated off-normal conditions of interim dry storage facility

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**Abstract**

Biaxial creep hebavior of hydrided Zircaloy-4 cladding was tested at 500°C. Creep-life was inversely proportional to H-concentration up to 750 wppm. The weakening through hydride reorientation of hydrided specimens was not observed by optical microscopy. The power-law stress exponents and the TEM observation supported the high-temperature climb mechanism dominated the creep behavior in secondary stage.

*Keywords:* Zircaloy-4, creep, biaxial, hydride, dry storage

## 1. Introduction

Low-temperature creep rupture of used nuclear fuel (UNF) cladding is regarded as a possible failure mechanism during long-term dry storage. The creep stress induced by the fission products and decay heat from the fuel dominates UNF's creep behavior. UNF hoop stress is regulated to <90 MPa with its cladding temperature <400°C for interim dry storage under normal operation [1]. For short-term off-normal and accident conditions, the maximum cladding temperature at a temperature below 570°C is allowed [1].

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